

ABSTRACT OF THE DISCLOSURE

A high-surface-area (greater than 600 m²/g), large-pore (pore size greater than 6.5 angstroms), basic zeolite having a structure such as an alkali metal cation-exchanged Y-zeolite is employed to convert NO_x contained in an oxygen-rich exhaust to N₂ and ON₂. Preferably, the invention relates to a two-stage method and apparatus for NO_x reduction in an oxygen-rich engine exhaust that includes a plasma oxidative stage and a selective reduction stage. The first stage employs a non-thermal plasma treatment of NO_x gases in an oxygen-rich exhaust and is intended to convert NO to NO₂ in the presence of O₂ and added hydrocarbons. The second stage employs a lean-NO_x catalyst including the basic zeolite at relatively low temperatures to convert such NO₂ to environmentally benign gases that include N₂, CO₂, and H₂O.